

The material as now defined is a commercially viable material which is the result of an optimisation of conflicting material properties. The composite has an adhesive with a compatible fire retardant material present in sufficient quantity to meet the requirements of the test DIN 4102:B2 while still meeting the optical requirements necessary for transparent shades with regards to transparency and haze, and which is sufficiently resistant to the long term effects of UV light.

Quite simply no prior art material meets these requirements.

The claimed composite differs from the composite disclosed in Valinski in that the adhesive comprises a polyurethane resin containing a RDP fire retardant, the composite has a lower range of light transparency making the film more suitable as a shade material, and in that the material has considerably improved haze properties, the PET outer film layer is defined as containing UVA, and the composite meets the fire retardant standard Din 4102:B2.

Valinski does not disclose such a material.

The assignee of the present application is also the assignee/Applicant of the Valinski application and can if required file herewith an Affidavit to the effect that the material taught in Valinsky did not meet the tighter fire standard DIN 4102:B2. Samples made in accordance with Valinski passed the fire standard DIN 4102:B3 but were unable to pass the more stringent B2 standard.

However it is believed that since the independent Claims 1,11 & 19 now define a selected fire retardant, not disclosed in Valinski, that the necessity for such an Affidavit is traversed.

Futhermore, when exposed to prolonged exposure from UV light, the FR containing layer of the material made according to Valinski, tended to excess bronzing and

yellowing on aging.

Valinski does not teach that the FR material may be added to the PET as is acknowledged by the Examiner.

The positioning of the UV absorbing PET as the outermost layer in the composite according to present invention, prevents the FR materials used in the composite from yellowing or bronzing on aging. The applicant acknowledges that Valinski teaches at page 8 lines 21/22 and page 12 lines 3-6 that the PET layer may contain UV absorber (UVA). However Valinski does NOT teach that the PET layer containing the UVA must be outside the FR containing layer. Valinski is silent on the relative positioning of the FR coating and the PET layer containing UVA, with regards to which layer in use is the outer layer. Indeed, it is submitted Valinski teaches away from the present Invention. In all the examples shown in Valinski an FR Coating 2 is the uppermost coating, and on page 11 lines 3/4 it is stated that the coating 2 can be on both top and bottom surfaces. Since the FR coating is either the top coating, or used as a top and bottom coating it will be subject to UV light.

The Examiner contends that Levchik teaches that Resorcinol bis(diphenyl phosphate) (RDP) may be added to polyester compositions to improve fire retardancy and therefore it is obvious to add RDP to the PET layer in Valinsky.

Applicant would observe that in the present invention as now claimed, the RDP fire retardant is specified for use in the polyurethane adhesive layer NOT the PET layer.

Levchik teaches that RDP is suitable for use in some polyester adhesive compositions *in the presence of a high charring polymer (see Col 1 lines 13/14) which makes it possible for the phosphorous containing additive to dissolve in the polyester (see Col 2 lines 25-35).* Examples of high charring polymers are given in Col 3 lines 17-27 and thermoplastic polyesters such as PBT and PET are specifically excluded. Furthermore the only example of fire retardant polyesters given in the Examples, contain PBT, not PET. There are no fire retardant samples comprising PET and RDP.

Levchik makes no reference whatsoever to the possible effects of fire retardant on the optical properties of the material to which the fire retardant is added, or to the problems associated with aging.

It is therefore submitted that present composite is not obvious in view of a combination of both Valinski and Levchik. The deficiencies of Valinski are not readily satisfied by the disclosures in Levchik. The two documents in combination do not point the way to the use of RDP as a fire retardant material in polyurethane adhesives and nor do they deal with the problems associated with the effect of fire retardants on the optical properties of the material to which it is added, or the effects of UV light on the fire retardant.

Pengilly discloses the use of fire retardants in polyester adhesives. The fire retardants are brominated bis phenyls (see Claim 1 B). Pengilly at Col 2 line 65- Col 3 line 5 acknowledges the problems associated with the use of FR in an adhesive and states that the adhesive can be somewhat hazy due to the presence of FR and states that haziness can increase as the concentration of FR increases. However the haze problem is then totally ignored. Pengilly discloses an adhesive containing FR which can be used to coat PET film and other flammable substrates, to act as a fire retardant for itself and the PET film/adhesive composite. However the composites disclosed in Col 3 line 40 to Col 4 line 15 are not transparent but are opaque due to the aluminium foil and therefore Pengilly does not need to deal with the problem of haze.

The applicant can demonstrate that the incorporation of FR materials into adhesives of the type disclosed in Pengilly gives rise to high levels of haze which is unacceptable in transparent composites. The Examiner submits that a suitably low haze material can be produced by reducing the FR material until the haze is of a sufficiently low value. This of course will reduce the fire retardant properties.

However, the Applicant has achieved a high performance fire retardant capability with

a low haze by using RDP in a polyurethane adhesive. (The requirements of DIN 4102:B3 are some of the most stringent requirements in the world.)

This is not disclosed in Valinski, Levchik or Pengilly either taken singly or in combination.

Any person having the teachings of Inanuma, that is a transparent sunshade, would only use the adhesive of Pengilly if the Haze properties of the composite were not critical. Inanuma does not teach a Sun shade containing FR materials. The problems associated with the incorporation of FR materials into transparent shade composites are totally ignored.

Since the film used in Inanuma is PET, then for the reasons discussed above, Levchik teaches away from the present invention since Levchik reaches that RDP cannot be used in PET without the presence of a high charring polymer.

The applicant is the first to arrive at a shade material which is clear, transparent, has little haze, meets the fire retardant standard to DIN 4102:B, and overcomes the problems associated exposure of the FR film composite to UV. This problem with FR containing composites is not disclosed in any of the cited art.

The applicant acknowledges that the use of PET film containing FR materials is derivable from Pengilly and that the use of UV absorbers with PET is known. However, the present invention relates to a composite film in which two PET layers are adhered together by a polyurethane adhesive containing RDP fire retardant. Such a composite material was not known. Furthermore the invention discloses that the outermost PET layer contains the UV absorber to avoid yellowing or bronzing of the FR containing adhesive. This problem is not mentioned or dealt with in any single piece of prior art.

The applicant has invented a shade composite film which meets the most stringent FR requirements (DIN 4102:B2), is transparent with low haze, and has good resistance to deterioration due to rapid breakdown of the FR material. This specific combination of

features is not shown in the prior art.

With regard to the Examiners comments on Claim 17 & 19, the present invention is the first disclosure of a sun shade having sound deadening characteristics. Once the present invention has been conceived, then in hindsight it might be obvious to use the teachings of Fuchs and Jablonka. However, the invention is the realisation that a shade can also be used for sound deadening. Fuchs and Jablonka are silent on FR Properties just as Valinski, Pengilly and Levchik are silent on sound deadening. The applicant realisation that a FR film composite can be used for the manufacture of sound deadening shades is novel and not obvious. The putting together of this combination of documents is really only possible ex-post facto of the invention.

None of the cited art, either singly or in combination, discloses the invention as now claimed in Claims 1, 11, & 19.

For the reasons given above, it is believed that the claims as presently amended should now be allowable and such action is respectfully requested.

If the examiner feels that are still a few minor matters to be resolved before issuing a notice of allowance, Applicants' attorney would welcome a phone call from the Examiner at the below listed phone number.

Respectfully submitted,

  
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